

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

This opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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PATENT OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

**Ex parte SHUNPEI YAMAZAKI, AKIRA MASE,
MASAAKI HIROKI and YASUHIKO TAKEMURA**

Appeal No. 95-1672
Application 07/885, 637¹

HEARD: January 14, 1997

Before THOMAS, FLEMING AND CARMICHAEL, **Administrative Patent Judges**.

FLEMING, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 21, 23, and 25 through 34. Claims 4, 7, 22 and 24 have been canceled. Claims 1 through 3, 5, 6, and 8 through 20 have been allowed by the Examiner.



¹ Application for patent filed May 19, 1992.

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The invention relates to a method of driving an electro-optical device. In particular, Appellants disclose on page 2 of the specification that Figure 6 shows an example of the electro-optical characteristic of a nematic liquid crystal which is typically used as a liquid crystal material in displays. The figure shows that the amount of transmitted light changes as voltage is changed. On page 5 of the specification, Appellants disclose that Figure 5 shows an example of a circuit of an active matrix of the liquid crystal display device. The active matrix comprises a matrix of pixel elements. Each pixel element includes a liquid crystal picture element connected to a modified transfer gate circuit structure, an N-channel thin film transistor (NTFT) and a P-channel thin film transistor (PTFT). A Xn signal line, referred to data signal line, and a Ym signal line, referred to as the address signal line, are connected to the transfer gate circuit structure.

On page 12 of the specification, Appellants disclose the operation of the circuit by referencing Figure 4. A reference signal Vyl is applied to the Y1 address signal line. The reference signal varies in time in a certain cycle. In Figure 4, the reference signal is a square wave. During the duration of the reference signal, a first bipolar signal Vx1 is applied only

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to the X1 data signal line. At the end of the duration of the reference signal applied to the Y1 address signal line, a second bipolar signal Vx1 is applied to all of the data signal lines. The signal supplied to the liquid crystal picture element can be adjusted depending on when the first bipolar signal is applied. Thus, the circuit shown in Figure 5 is able to vary the amount of light that is transmitted by each liquid crystal picture element.

Independent claim 21 is reproduced as follows:

21. A method of driving an electro-optical device comprising the steps of:

applying a reference signal to one of address signal lines with no signal applied to the address signal lines other than said one of address signal lines during duration of said reference signal;

applying a bipolar signal comprising two pulses having opposite polarities to each of data signal lines during duration of said reference signal; and

applying a bipolar signal comprising two pulses having opposite polarities to all of the data signal lines at the same time during an interval between each application of said reference signal to said address lines.

The references relied on by the Examiner are as follows:

Morokawa	4,630,122	Dec. 16, 1986
Ohwada et al. (Ohwada)	4,818,077	Apr. 4, 1989
Mori et al. (Mori) (Japanese Kokai Patent Application ²)	53-144,297	Dec. 15, 1978

²A copy of the translation provided by the U.S. Patent and Trademark Office, May 1993, is included and relied upon for this decision.

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Claims 21, 23 and 29 through 31 stand rejected under 35 U.S.C. § 102 as being anticipated by Morokawa. Claims 25 through 28 stand rejected under 35 U.S.C. § 103 as being unpatentable over Morokawa and Ohwada. Claims 32 through 34 stand rejected under 35 U.S.C. § 103 as being unpatentable over Morokawa and Mori.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the briefs³ and the answer⁴ for the details thereof.

OPINION

After a careful review of the evidence before us, we do not agree with the Examiner that claims 21, 23 and 29 through 31 are anticipated under 35 U.S.C. § 102 or that claims 25 through 28 and 32 through 34 are unpatentable under 35 U.S.C. § 103.

³Appellants filed an appeal brief on June 21, 1994. We will reference this appeal brief as simply the brief. Appellants filed a reply appeal brief on December 20, 1994. We will reference this reply appeal brief as the reply brief. The Examiner stated in the supplement Examiner's answer mailed November 1, 1995 that the reply brief has been entered and considered.

⁴The Examiner responded to the brief with an Examiner's answer, mailed October 19, 1994. We will refer to the Examiner's answer as simply the answer. The Examiner responded to the reply brief with a Supplemental Examiner's answer mailed November 1, 1995. We will refer to the Supplemental Examiner's answer as simply the supplemental answer.

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It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. *See In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138, (Fed. Cir. 1986) and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485, (Fed. Cir. 1984).

Turning to the claimed limitations, Appellants' claim 21 recites:

applying a reference signal to one of address signal lines with no signal applied to the address signal lines other than said one of address signal lines during duration of said reference signal ... and *applying a bipolar signal comprising two pulses having opposite polarities to all of the data signal lines at the same time during an interval between each application of said reference signal to said address lines* [emphasis added].

Thus, Appellants' claim 21 requires that the bipolar signal is applied during a time interval which is in between the application of each reference signal. We note that Appellants' claim 23 also requires this limitation.

On page 3 of the answer, the Examiner states that Morokawa teaches applying a reference signal, shown as signals T1 to T4 in Figure 3, to an address line. On page 4 of the answer, the Examiner states that Morokawa teaches applying a bipolar signal to all of the data signal lines between the drive phase interval

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shown as the rest signal in Figure 3. Thus, the Examiner is reading Appellants' claimed limitation "during an interval between each application of said reference signal to said address line" on Morokawa's drive phase interval.

Morokawa teaches in Figure 3 and column 9, lines 17-26, that the drive phase is an interval in which all of the timing signal pluses T1 to T4 are applied for the display region. This is further emphasized in column 7, lines 44-63. Thus, the rest signals are applied only after all of the timing signals pulses T1 to T4 are applied.

As we pointed out above, Appellants' claims 21 and 23 require that the bipolar signal be applied during an interval between each application of the reference signal to the address lines. In other words, the bipolar signal is applied in an interval **between** the application of the reference signal to one address line and the next subsequent application of the reference signal to the next address line. The Morokawa drive phase fails to meet the Appellants' limitation, "**during an interval between each application of said reference signal to said address lines**", because the drive phase is **not** an interval **between** each timing signal pulse T, but instead is an interval that **follows after all** of the timing signal pluses T1-T4 have been applied to the

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address lines. Therefore, we will not sustain the Examiner's rejection for claims 21 and 23.

Turning to claim 29, we note that the claim does not require that the reference voltage be applied in an interval between the application of a reference signal to one address line and the next subsequent address line. Appellants' claim 29 recites:

scanning the address lines in sequence with a reference voltage ... and
removing the reference voltage supplied to said pixel electrodes *during an interval between each scanning period of the address lines with the reference voltage* [emphasis added].

Thus, Appellants' scanning period is properly read as being an interval after all of the address lines have been scanned. Therefore, we find that the Examiner properly found that the Morokawa drive phase meets this limitation.

Appellants point out on pages 6 of the reply brief that Appellants' claim 29 is specifically directed to an active matrix electro-optical device comprising a plurality of pixel electrodes in a matrix form and switching elements respectively provided for said pixel electrodes. Appellants argue that Morokawa fails to teach an active matrix in which switching elements are provided for each pixel electrode.

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The Examiner argues in the supplemental answer on pages 1 and 2 that this limitation is shown in Ohwada. However, we fail to find this argument helpful because the rejection is based upon being anticipated by Morokawa.

We note that Appellants' claim 29 recites in the preamble the following:

an active matrix electro-optical device comprising a plurality of **pixel electrodes** in a matrix form, switching elements respectively provided for said pixel electrodes, and a plurality of **address lines** and **signal lines** connected to said switching elements....

Furthermore, Appellants' claim 29 recites:

scanning the address lines in sequence with a reference voltage;
applying select signals selectively to the signal lines
... so that the pixel electrodes at intersections
between said one of the address lines and the selected
signal lines are supplied with the reference voltage;
and
removing the reference voltage supplied to said pixel
electrodes...[emphasis added].

Although no "litmus test" exists as to what effect should be accorded to words contained in a preamble, review of a patent in its entirety should be made to determine whether the inventors intended such language to represent an additional limitation or mere introductory language. *Corning Glass Works v. Sumitomo Electric U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989); *In re Stencel*, 828 F.2d 751, 754, 4 USPQ2d

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1071, 1073 (Fed. Cir. 1987). Finally, we note that determination of whether the preamble language further limits the claim turns on whether the language "breathes life and meaning into the claims and, hence, is a necessary limitation to them" *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 866, 228 USPQ 90, 92 (Fed. Cir. 1985).

Upon reviewing the specification and upon considering Appellants' claims as a whole along with Appellants' arguments that the claim is limited to an active matrix having switching elements respectively provided for each pixel electrode, we find that Appellants intended the preamble language to represent an additional limitations in which the method is used with this switching element resulting in a driving signal for the active matrix electro-optical device. The highlighted portions of the body of claim 29 directly refer to the highlighted portions in the preamble of this claim by the use of the article "the." Thus, the preamble language is not merely introductory language. Therefore, since Morokawa does not relate to an active matrix electro-optical device, we will not sustain the Examiner's rejection of claims 29-31 as being anticipated by Morokawa.

Turning to the rejection of claims 32 through 34 as being unpatentable over Morokawa in view of Mori, Appellants point out

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on page 8 of the reply brief that these claims are dependent upon claim 29 where claim 29 recites an active display matrix. Appellants argue that there is no suggestion of combining Morokawa with Mori.

It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the reasonable teachings or suggestions found in the prior art, or by a reasonable inference to the artisan contained in such teachings or suggestions. *In re Sernaker*, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." *Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), citing *W. L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), citing

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In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

The Examiner states on page 6 of the answer that Morokawa fails to teach the specific connecting arrangement of the p-channel transistor and the n-channel transistor as claimed in Appellants' claim 32. The Examiner argues that it would have been obvious to modify the electro-optical device of Morokawa to have the specific connecting arrangement of the p-channel transistor and the n-channel transistor of Mori because the arrangement could have increased the reliability of the matrix display by applying the AC driving method such as symmetrical waveform as suggested by Mori.

However, the Examiner does not point to any evidence in the prior art that supports that the Mori arrangement would increase the reliability of the displays in which the pixel electrodes are driven by a matrix segment driver and timing driver as taught by Morokawa. Furthermore, we fail to find any suggestion to use the Mori transistor arrangement as a switch at each display electrode, then use the Morokawa method which employs the Morokawa segment drivers and timing drive to avoid placement of these switches at the display electrodes. We are not inclined to dispense with proof by evidence when the proposition at issue is

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not supported by a teaching in a prior art reference, common knowledge or capable of unquestionable demonstration. Our reviewing court requires this evidence in order to establish a *prima facie* case. *In re Knapp-Monarch Co.*, 296 F.2d 230, 232, 132 USPQ 6, 8 (CCPA 1961). *In re Cofer*, 354 F.2d 664, 668, 148 USPQ 268, 271-72 (CCPA 1966). Thus, we will not sustain the rejection of claim 32 through 34 as being unpatentable under 35 U.S.C. § 103.

The Examiner also rejects claims 25 through 28 under 35 U.S.C. § 103 as being unpatentable over Morokawa and Ohwada. On page 5 of the answer, the Examiner states that Morokawa fails to teach that the timing determines the magnitude of a voltage applied to the pixel electrode as recited in Appellants' claims 25 through 28. The Examiner argues that Ohwada teaches that the magnitude of the voltage shown as V_{sig} in Figure 4 is adjusted in time. The Examiner argues that it would have been obvious to modify the electro-optical device of Morokawa to have the feature of adjusting the applied voltage for the pixel electrodes of Ohwada so the variations in brightness or gradation can be realized.

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On page 7 of the reply brief, the Appellants point out that Ohwada teaches in Figure 3 the amplitude modulation of the signal applied to the pixels Vsig1, Vsig2 is affected in turn by the amplitude modulation of the signals applied to the data lines. Appellants argue that Appellants' claims 25 through 28 require that the magnitude of a voltage applied to the pixel electrode is determined by the *timing of the bipolar signal* applied to the data signal line during the duration of a reference signal applied to the address signal line. Appellants emphasize that Ohwada does not teach that the timing of the data signal determines the magnitude of the voltage applied to the pixel electrode rather Ohwada teaches that the amplitude of the data signal, Vsig, shown in Figure 3 determines the amplitude of Vlc. We agree and thereby will not sustain the Examiner's rejection of claims 25 through 28 under 35 U.S.C. § 103.

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In view of the foregoing, the decision of the Examiner
rejecting claims 21, 23, 25 through 34 is reversed.

REVERSED

JAMES D. THOMAS)
Administrative Patent Judge)

Michael R. Fleming)
MICHAEL R. FLEMING) BOARD OF PATENT
Administrative Patent Judge) APPEALS AND
) INTERFERENCES

James Carmichael)
JAMES CARMICHAEL)
Administrative Patent Judge)

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Sixbey, Friedman, Leedom & Ferguson
Suite 600
2010 Corporate Ridge
McLean, VA 22102